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The Uses and Limitations of the X-rays in Horse Practice.*

By

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During the past few years the staff of this School have been enquiring into the possibilities of the more extensive use of the X-rays in the diagnosis of obscure conditions affecting horses. Certain conclusions, which I will endeavour to represent to you, have been arrived at concerning their sphere of utility as far as military animals are concerned. I am not qualified to say whether these conclusions are in any way applicable to general practice. Conditions are obviously dissimilar. In Aldershot we have a dense horse population in a small area and a central X-ray clinic meets requirements very well. Outside the Army an X-ray installation would have to serve a much larger area if it was going to pay its way. These statements of course pre-suppose the proved utility of X-rays in horse practice—a point on which I anticipate differences of opinion. Our experience here indicates that the X-rays assist diagnosis in a sufficient number of cases to warrant their employment. On the other hand, conversation with many other members of the profession reveals the opinion that the X-rays in horse practice is a very imperfect box of tricks.

One may ask why this view is held so commonly. Firstly, I think that the lack of systematic enquiry into the whole business is to blame, and for this a dearth of funds for research purposes is probably responsible. Secondly, the opinion that the X-rays are useless for horses is based often on one or two personal experiences where an apparatus of inadequate power has been employed and where the interpretation of the result, which was probably poor, was left to someone with little experience of reading films. In such circumstances there was every justification for forming an unfavourable opinion. Equine radiology is a specialised branch and must be treated accordingly. Thirdly, various people have expressed views on equine radiology which I believe to be erroneous but which may have persuaded veterinary surgeons that there was no place for the X-rays in our diagnostic armoury. An article published in a recent number of the *Veterinary Journal* contained such statements as " the technical X-ray difficulties in the larger animals often amount to impossibilities "; also, " the larger animals may require a special radiographic or veterinary operating table." Again it is said that " the transport of racehorses or valuable hunters may be out of the question and a portable apparatus is necessary." Of course under certain circumstances these statements may be true, but in the main they represent a point of view to which I am unable to subscribe. We have X-rayed over 120 different living horses here, involving over 400 exposures, and I venture to say that the technical difficulties do not by any manner of means amount to impossibilities.

In the case of the horse's limbs we can take a picture of uniform quality in practically 100 per cent. of cases. But we could not do it if we put our patients on an operating table. Moreover, if you can do a horse standing up you are surely not justified in going to the time, trouble, expense and risk of injury involved in casting him. In addition, the *sine qua non* in making a successful film is to have your patient motionless. I ask you to consider how much added immobility you are going to get from casting. I prefer to think that unless you use deep anæsthesia your animal will be struggling most of the time. Advocates of the recumbent position support their argument as to the necessity for casting by a further contention, which is that when the horse is on his feet he moves or flinches at the buzzing noise which is set up when the switch is let in. The amount of noise produced varies widely with different sets, but even if only slight is usually resented by the horse. We find that this difficulty can be overcome by the simple expedient of plugging the ears with cotton wool. This has been done with our last sixty cases and none of them appear to have heard the noise at all.

Now as to the question of portable apparatus as opposed to stationary apparatus. My experience of the former is very limited but I am doubtful as to whether the amount of electric current with which they can deal is going to be as copious or as stable as when it is obtained from a power house and transformed under constant conditions. The bulk of our work here is performed with a milliamperage of 42, a peak voltage of 90,000, a tube-film distance of 26 inches and an exposure of $1\frac{1}{3}$ seconds. If portable sets will do this they have the obvious advantage that they can be taken to any patient, anywhere. On the other hand, if they cannot do it, I doubt their ability to penetrate the thick bone of horses to a sufficient degree to be of general assistance in diagnosis. Of course a weak current or an excessive tube-film distance can be compensated for within limits by a lengthened exposure, but this is a grave disadvantage on account of the increased probability of the horse moving. Fast work is essential.

A further disadvantage of any portable set for horses lies, to my mind, in the fact that the operator is working in different surroundings each time. This may matter very little where the patient is a reasoning human being or an easily manipulated small animal. Such subjects can be made to take up the desired position without much difficulty, but with the less easily disposable and perhaps

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obstinate horse trouble is likely to be encountered in adhering to standard positions. Remembering that a distance of a few inches or an angle of a few degrees may make or mar the result, the equine radiologist operating a portable set would have to calibrate afresh each time and force of circumstances might compel him to do so hastily or inaccurately. On the other hand, in a stationary X-ray clinic lines and angles can be worked out at leisure and painted on the floor. All that remains is to make the horse stand on a certain line and your distance and angle are known at once. Finally, the class of case which is likely to be helped by X-ray examination can generally stand in an ambulance and the cost must be much the same whether you send your case to a clinic in an ambulance or motor your portable set to the stable. In speaking of stationary sets I mean those in which only the electrical apparatus and not the X-ray tube itself is fixed. The X-ray tube must always be capable of being trolleyed round the building in which it is housed, its range of movement being limited only by the length of the high tension cables—in our case about 25 feet. We started work here with a tube box which could only be moved a foot or two either horizontally or vertically. This necessitated inducing the horse to stand within the required distance of the tube and we found many horses which gave difficulty when one tried to get them to face such an unusual object.

On the other hand, the proportion of horses which object to having the tube-box wheeled up to them is very small. Why a horse will allow a strange object to be brought near him but will not approach the same object of his own volition is an equine psychological factor which I cannot explain.

The real utility of the X-rays in horse practice is limited to the limbs and if the old dictum is true that " a veterinary surgeon's living is made below a horse's knees and hocks" we have a sufficiently large field to justify equine radiography. This is a point that many people do not appreciate. They seem to think that because you cannot X-ray pretty well every part of the horse's body there is no use for the X-rays at all. Whilst, as I have said, it is normally unnecessary to cast your horse for limb examinations, one has to consider whether there are any parts of the body which cannot be done with the animal standing up, but which could be done with the animal in the recumbent position and anæsthetised. The School's new tube is designed for use in both positions, but we have given priority to limbs and so far have not had sufficient time to report on its possibilities with the patient thrown. My own surmise is that there is not a big field open. A little work has already been done elsewhere. In Edinburgh and London they have done a few films of fractured jaws and of teeth taken with the film inside the mouth as dentists use it. The results are fair, but clinical diagnosis usually suffices in these cases. One thinks of X-raying the vertebræ and pelvis. For lumbar and sacral vertebræ and certain parts of the pelvis the film might be held in the rectum, but the trouble is that a suspicion of fracture in any of these parts is a clear contradiction to throwing the animal and anyone who took the risk would be a bold man. Moreover, you have to X-ray these parts experimentally many times before you are competent to judge films and, in view of the small demand for X-ray examination of these injuries, I doubt whether such a long and tedious enquiry would be justified. I think the elbow, stifle and hock, parts which cannot be done very well in the standing position, are about the only regions in which throwing the horse would really help.

Now for a few essential points to be observed in X-raying the horse's limbs. Any excess of high spirits should be removed by a restricted diet and by such exercise as the animal is capable of taking. Just before entering the X-ray room the ears should be plugged with cotton wool. If the foot is to be X-rayed the shoe should be removed. If it is left on, the metal causes undesirable scattering of the rays and tends to blurr the picture. Every particle of grit or gravel must be removed from the hoof by searching and washing, for a very small fragment of stone shows up prominently on the film and may be mistaken for a foreign body or other indication of disease. Yet another step is necessary when the foot is being examined. The middle and lateral frog clefts must be filled with a substance of as nearly as possible equal density as the horn of the frog itself. This point baffled us for a long time. We found that in every foot picture we got three dense shadows crossing the navicular bone and masking an important region. By experiment we found that these shadows were due to the depressions caused by the frog clefts and that if they were filled with a paste consisting of fine hoof raspings and lard they could be eliminated. If navicular disease is suspected I think there is very little hope of deriving any assistance from X-ray examination unless this condition is complied with. In getting the patient to approach the tube and take up the desired position, patience and careful handling are the secrets of success. A shove or a shout from an impatient attendant may destroy all your chances of X-raying a highly-strung animal. Quiet manipulation scarcely ever fails. Twitches and other mechanical methods of restraint we find useless. A dose of chloral hydrate helps occasionally, but more often than not it just makes the horse staggery on his legs whilst leaving his sensory powers unimpaired. I recommend its use only as a last resort.

Now, Gentlemen, words alone will not carry much conviction in such a subject as this. It is the demonstration of actual results which is required and here we have encountered great difficulty. The films are here, but with an assembly of this size it would be impossible for more than a few people to inspect them by crowding round the usual small electric screen. We have, therefore, had a selection of them converted into lantern slides. It is by no means the best method of showing them and they have been prepared at very short notice, but I will be glad if you will accept them as the best available means of illustrating this paper.

I find I have made no mention of X-raying horses by means of the fluoroscopic screen. It is a method which I regard as distinctly dangerous to the operator. With small animals good views can be obtained with quite a low current and it is safe and often convenient. With the horse, far too high a current is required to penetrate the thick bones and I should not care to do much of it.

Of the use of the X-rays as a curative I have no experience. I think it ought to be tried in canker of the horse's foot, but there is a lot of preliminary work in relation to dosage and filters to be done first.

In conclusion, I would like to say that the radiological examination of the horse's limbs may not necessarily be limited to bone lesions. One of my predecessors obtained a remarkable picture of a sprain of the perforans by using a carefully controlled low current which was insufficient to penetrate the softer structures. I think most will agree that the localisation of a sprain has an important bearing on prognosis but is not always easy in a densely filled leg. If the X-rays will establish our opinion on fact instead of on conjecture there should be a field of utility for it in such cases.

Gentlemen, I thank you for your kind attention and trust you will help by favouring us with the frank expression of your opinions.

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At the conclusion of his paper, Major Pryer greatly interested the company, and added much point to his remarks, by throwing upon the screen a number of photographs illustrative of recent pathological X-ray work at the Army Veterinary School. Following X-ray photographs of normal feet, pasterns and phalanges, came X-ray pictures of fractured pisiform, split pastern, joints showing ostitis and anchylosis, and of sidebones, the latter revealing plainly the inequality between sound and affected wings of the os pedis and the lateral cartilages. A photograph illustrative of fracture of the wing of the os pedis elicited the interesting information from the lecturer that one could, with a fair degree of accuracy, tell from an X-ray photograph of the os pedis the age of a horse, because as the horse grew older the wings of the os pedis grew longer and more dense.

X-ray pictures illustrative of navicular disease followed, Major Pryer commenting that they had found very striking differences in the appearance of navicular bones in sound and lame horses. In diseased bones, added width was the commonest demonstrable lesion. A spur or exostosis at the outer end of the bone had been encountered in 23 per cent. of cases, but this appeared to be a late change.

Of very great interest, also, were pictures illustrating the possibility of ascertaining, by X-ray, the presence of foreign bodies. In this connection it was noteworthy that, while a pin showed up with remarkable clearness, a blackthorn under the coronet failed to show up well, the explanation being that woody, or fibrous, materials let through a considerable proportion of the rays and rendered their radiological detection exceedingly difficult.

Discussion.

The President (Major G. W. Dunkin), in calling upon Professor Wooldridge to open the discussion, observed that they had listened to a very interesting and instructive discourse on the use of X-ray in the diagnosis of equine ailments, and he hoped that as many of them as possible would take part in the discussion.

Major Pryer had been kind enough to give them a frank statement of his views as to the limitations of X-ray work. He (the President) had never been one of those people who held pessimistic views in regard to it, because it seemed to him that there were vast possibilities in their use, in view of the fact that there was so much to be learned regarding the causes of the bony lesions which were unfortunately so frequent in horses.

The limitations of his knowledge of the subject, however, were such that he would confine himself to asking one question, and that was this: Was Major Pryer able to tell them, for example, whether it was possible or impossible to detect the presence of a lesion in a pastern which the previous history of the horse showed to have been split without displacement and without any enlargement that could be detected by ordinary examination? He asked the question because it was one which he himself had been asked on many occasions, and one to which he had not felt justified in giving a reply.

Professor G. H. Wooldridge said that it was rather a difficult proposition to open a discussion on a paper of that kind because they had had such an excellent demonstration of the usefulness of X-rays in regard to the limbs of the horse.

He thought he must agree with Major Dunkin when the latter said that Major Pryer had at any rate demonstrated to them that they could make a great deal more use of X-rays in regard to horses' limbs than had been the case hitherto. He agreed with Major Pryer as to the necessity for experience in the reading of radiographs and the results of X-ray in general. He had shown them on the screen how easily one could be mistaken. Let them take, for example, those cases Major Pryer had shown them of feet affected with navicular disease. He was quite convinced, from films he had examined, that he would not have recognised those so-called spurs as being a definite indication of navicular disease, but Major Pryer had told them that in no instance in a sound foot had he found these lesions, and that he had only met with them in cases of navicular disease. That was a most instructive piece of information—(hear, hear)—but these were only present in advanced cases which would probably not give much difficulty in diagnosis by clinical methods.

It would be a great asset if at any time X-ray could be developed to such an extent as would reveal caries of the cartilage at the back of the navicular bone; *i.e.*, in the incipient stages of the disease. Those were the really difficult cases to diagnose.

With regard to the apparatus Major Pryer had shown, he was very struck with the almost complete absence of noise. His experience had been that horses exhibited a certain degree of fidgetiness, largely attributable to the noise of the installation. In the case of the demonstration animal, his view was that the horse would not have fidgetted at all even if his ears had not been plugged with cotton wool. Undoubtedly Major Pryer was right in saying that the instrument must be brought to the horse and not *vice versa*: the animal would fight against it, and if they could get the installation into the required position without disturbing the horse they would succeed—that suggested that a portable apparatus might be of considerable service, at any rate the tube must be moveable. One had seen very excellent results from the use of a portable apparatus; pictures quite as good as were some of the excellent pictures they had seen that day; and he did not agree that it was always as easy to take the patient to the apparatus as it was to take the apparatus to the patient. Take, for instance, some young thoroughbred that might have sustained some injury to the foot: those youngsters could not easily be put into an ambulance and taken away to a stationary apparatus.

He did not know of any work that required more patience in getting the desired picture than the attempt to take an X-ray of a thoroughbred colt. Photographers said that to photograph children required a lot of patience, but that was really child's play compared with the task of trying to X-ray a horse's foot when the animal had not been handled a great deal. Major Pryer had suggested that it might be possible to utilise the film in cases of fractured pelvis by inserting the film per rectum, but a grave drawback to that would be the almost inevitable distortion.

He thought that Major Pryer was to be congratulated on that little discovery of his—it was the little discoveries that counted for so much, after all, in the progress of science—of the use of that hoof-paste in radiographing the foot. He must confess that in attempting to X-ray the foot the shadows of the various clefts had interfered in the achievement of what one could feel was a satisfactory reading; in their absence (by the use of the paste) the reading would be greatly facilitated.

With regard to the presence of foreign bodies in the foot, the pin which had been shown them was well to the

side of the accompanying bone: he would have been more impressed if the pin had been in line with the bone, so that one could have seen the effect of the X-ray through the bone with the foreign body superimposed. He suggested that both lateral and antero-posterior exposures should be taken, for comparison, in cases of that kind.

Where one had a dense enlargement in the neighbourhood of the joint and one had doubted whether there had been any osteo-arthritis or merely a thickening of the bone or of the fibrous structures around the joint, an X-ray in a case of that kind helped one straight away, because if there was no osteo-arthritis one got a clear picture of the bone.

He thought they owed Major Pryer a big debt for showing them some of the limitations of X-rays, but, more particularly, the advantage that could be taken of their use. The process was only in its infancy even yet, but that was all the more reason why more experimental work should be carried out.

Major-General Sir Layton J. Blenkinsop, Colonel Commandant, R.A.V.C., observed that he was afraid he had not very much to say beyond congratulating Major Pryer most sincerely upon producing those X-ray photographs. He could, however, tell them a small tale about X-rays. Upon a very wet night in the winter of 1905-6, when three or four men were sitting in the Craven Club in Shaftesbury Avenue, and not quite knowing what to do, a telegram came from Germany about an X-ray having been taken of a man's hand. Immediately they got busy: one member found a Kock's tube and another found a coil, and they attempted to take a photograph of the hand. They got quite a distinct photograph, and that, he believed, was the first X-ray photograph taken in England. (Applause.)

Down at Woolwich they started to attempt to take photographs of the horse's foot, similar to those Major Pryer had shown upon the screen. The dead foot they could take, but with the foot of the live subject they were unsuccessful. Then electric current was produced from wet cell batteries, and it took an enormous time. The first pathological photograph he saw taken was with this apparatus—fracture of the ulna in a man—and it took four hours to get it.

If they appreciated all the difficulties that were encountered in the initial stages of X-ray work they would agree with him when he said that they had gone a very long way since then and they had done work which really was going to tell very greatly to the advantage of the practitioner: in legal cases it certainly would be a great help.

The Royal Army Veterinary Corps had been working perseveringly with X-ray for a long time. In the South African War they sent them out a portable X-ray, but no one had had any experience if its use nor were any instructions sent, so they did not obtain any photographs. (Laughter.) In the Great War the authorities were hard up for X-ray apparatus to test shells, therefore they gave up the apparatus then at the Army Veterinary School to the War Office, getting in exchange for it a better plant after the War.

He told them these things to show them that the display they had seen that afternoon represented very careful and continuous work, and work which he thought they could be congratulated upon because it had produced some very definite results. (Applause.)

He would like to thank Major Pryer very much for the most interesting lecture he had given them.

Major Kirk said he had listened with considerable interest to Major Pryer's lucid address, and was perhaps all the more interested because he, himself, had lately taken up radiography. His own use for Röntgen rays was more or less confined to the small animals, but he of course never knew when he might be called upon to X-ray a horse.

With this thought in mind he had made some experimental exposures of a normal light draught horse's leg, and had brought with him the resulting films. At first he gave a 14-second exposure at 16 inches F/F distance, using two intensifying screens; but he found his original films were overexposed.

Eventually he found that ten seconds' exposure was sufficient, and he thought that anybody who examined his negatives must agree that they were remarkably good. He had been surprised to find, in the picture taken antero-posteriorly through the foot, that one wing of the os pedis had been fractured, the loose piece being shown about ¾-in. away from the main bone.

As Major Pryer had said, it used to be considered that a portable X-ray apparatus was quite inadequate to skiagraph horses' bones. He (Major Kirk) thought that such a view could no longer be held. His own apparatus was portable and he actually took it in his car to the stables where the exhibited pictures were taken.

The main portion of the apparatus packed into a special sort of suit case and weighed 30 lbs., whilst the transformer formed a separate unit weighing 40 lbs.

It could be assembled in about five minutes, and was plugged into the ordinary electric lighting circuit. Its portability (or rather, mobility) was not restricted by the length of the high tension cables, as Major Pryer had stated was a disability associated with so many makes of apparatus. The length of flex was the only restriction, and this could, of course, be multiplied to an unlimited extent at very small cost.

Major Pryer had expressed the opinion that insufficient voltages would be generated by a portable apparatus, but Major Kirk pointed out that the normal high tension current of his machine was 45,000 volts. The peak voltage of the apparatus just viewed by the assembly was 90,000. By the addition of another piece of mechanism, known as an amplifier, to his portable apparatus, the voltage could be stepped up to about 85,000 or 90,000. The apparatus, so constituted, would then probably penetrate as many parts of a large animal's body as could be penetrated by the far more costly, bulky, stationary equipments; and, in addition, it was comparatively very cheap to buy, very simple to work, and light to carry. Furthermore, a ten-seconds' exposure would be reduced to five seconds.

Animals, in his experience, had not been known to show any fear of the instrument in use, as the sound emanating from the switch (unlike that from large stationary apparatus) was infinitesimal.

The remarks which fell from Professor Wooldridge concerning greyhounds reminded the speaker that one of the commonest accidents connected with greyhound racing was the condition known as "knocked-up-toe." Major Kirk at one time believed that the large hard swellings which appeared around digital joints were due either to dislocation of the digital bones or fracture of their epiphyses. Whilst this assumption was undoubtedly true in some cases, he had learned from X-ray photographs that many of these swellings were due only to fibrous thickening resulting from sprains.

As Sir Layton Blenkinsop had reminded the meeting, tremendous advances had been made in the efficiency of X-ray apparatus and methods, and Major Kirk said that a good deal of this advancement was to the credit of the film makers. Year by year films became more highly sensitive to the rays, and the length of exposures had been reduced largely on account of greater film rapidity, combined with the use of and improvement in intensifying screens.

Research was continuing in this direction and we might be optimistic as to the future. In view of a recent and very important discovery, Major Kirk foresaw the future possibility of radiographing even the trunk of the horse. He referred to the discovery, by two officers in the United States Navy, of a curious gas which gave forth a ray far shorter than the Röntgen ray, and by means of which they had been able to penetrate six inches of solid steel.

Major Kirk wished to add his thanks to Colonel Mosley and his officers for their kind and jovial hospitality, and to Major Pryer for reading such a unique and useful paper. (Applause.)

The Reply.

Major Pryer, replying to the points raised in the discussion, first expressed his thanks for the very kind way in which his audience had received his paper.

With regard to the point that had been raised by Major Dunkin—could one detect a previously-split pastern?—it was a point upon which he had had no previous experience, but from such work as had been done he should say that the margin of error on the positive side would be very small indeed. He thought that a proportion of cases would show the line of fracture quite plainly and that it should not be confused with anything else; therefore, in his view, it was worth while subjecting them to radiological examination.

Professor Wooldridge had referred to the absence of noise. There was, he understood, a proposal on foot now to cover that portion of the apparatus which was sunken in the pit, and from which the noise emanated, with sea weed or peat moss, which was said entirely to stop the noise.

With regard to the question of portable apparatus, raised by Professor Wooldridge and Major Kirk, he was perfectly open to conviction, and the one thing he should remember about that meeting was that for the first time he had seen some excellent pictures taken by portable sets —Professor Reynolds had shown him some and so had Major Kirk. He thought that Major Kirk's exposure was a long one: they found there that a horse would stand motionless for two seconds and then started trembling, developing a sufficient degree of movement to confuse the issue when the film was developed. There was the old objection to the portable apparatus, *viz.*, that one might make a long journey with it, only to find that no electrical installation was laid on.

With regard to Professor Wooldridge's observation concerning the use of the film for rectal exploration, he thought that at present its employment in that manner was little more than a dream, but it was something he should like to try out, for, after all, it was a commonplace thing in modern dentistry for dentists to take a film in one's mouth, and they appeared to be able to read it well.

The demonstration of carious areas in the early stages of navicular disease was the crux of the whole question: they could be seen under certain conditions. With the help of Doctor Pullen, Director of the Radiological Department at Woolwich Arsenal, bones from known navicular disease subjects had been X-rayed after embedding in paraffin wax, and the erosions showed very clearly.

To penetrate the horn of the living foot and shew them equally plainly was more difficult. The patches of erosion were often only the size of a hemp seed and therefore one could only expect to see minute changes in the X-ray picture. Major Pryer was satisfied in his own mind that these lesions could be demonstrated, but he considered the data collected up to the present time was insufficient to place before a scientific meeting. He believed, however, that they were well on the way to demonstrating radiologically even comparatively recent diseased processes in the navicular bone. The work of locating these erosions by the X-rays and checking the accuracy of the results by a long series of *post-mortem* examinations was being continued.

The differentiation of osteo-arthritis and fibrous thickening was, of course, most important.

In conclusion, Major Pryer observed that he apologised if there were any points in the discussion to which he had omitted to reply, and, once again, he desired to thank his hearers very much.

How importers of meat help the authorities is described by Dr. C. F. White, Medical Officer of Health, Port of London, in his annual report. He states that importers realise that it is in their own interests to attain a high standard of examination at the source, and also to have their goods packed and prepared in such a way that rapid examination by the port authorities is possible. Thus, ox tongues arrive dressed so as to have the lymphatic glands easily accessible. Further, when diseased or unsound food is discovered, it is almost invariably voluntarily surrendered, and Dr. White says that it is very rare indeed for the authorities to have to go through the formal procedure of seizure and condemnation by a magistrate.

Undulant Fever Conveyed by Milk.*

British Medical Association Congress Discussion.

Sir Weldon Dalrymple-Champneys, opening the discussion, said that systematic examination of milk supplies in Great Britain, if possible by guinea-pig inoculation, was badly needed. But if, as could hardly be doubted, these examinations revealed that a considerable proportion of unpasteurised milks contained *Br. abortus,* what was the explanation of the small number of human cases of undulant fever so far discovered? Thirty-four definite cases of endemic origin in England and Wales and five in Scotland were known to him. In Rhodesia, where contagious abortion was not so rife as in this island, Bevan reported more than two hundred human cases, and in the United States 1,305 cases were reported during 1929. The speaker predicted that further investigations would show that undulant fever was much commoner with us than would appear at present, a large proportion of the infections being so slight that the patients never called in a doctor. It should not on this account be taken lightly, for undulant fever was a disease full of unexpected tricks, with an epidemiology still shrouded in mystery.

Dr. A. G. Shera (Eastbourne) gave an account of four cases of undulant fever. The first patient was a youth of 16 years admitted to hospital, the second a member of the visiting surgical staff, the third a boy in one of the schools, and the fourth a former house-surgeon. The visiting surgeon had not been in actual attendance on the first case, but had attended the school in which the third case had occurred. The house-surgeon was engaged to be married to the sister in charge of the ward in which the first case had been nursed. The last two patients became ill simultaneously, but direct contact between them all had not been definitely established. The source of the infection had not been traced. There had been, however, an outbreak of contagious abortion within a few miles of the farm where the first patient lived. Blood cultures in cases one, two, and four, had failed to demonstrate the organisms. The maximum agglutinations were 1 in 5,000, 1 in 2,500, and in two 1 in 250. The titres, the speaker thought, ran parallel with the severity of the cases, and a drop was a good prognostic sign.

Dr. A. V. Neale (Birmingham), in a paper on infantile diarrhœa, said that the rapid depletion of tissue fluids and loss of the normal intestinal secretions was a serious matter to the infant. Ketosis, together with disturbance in the acid-base equilibrium, was soon effected, and a variable degree of acidæmia or alkalæmia occurred. The delicate protective mechanisms in the bowel were quickly removed, and, by absorption, highly toxic products might enter the body. Renal, hepatic, and myocardial functions were often seriously disturbed by the dehydration and intoxication, and failure of the functions of these organs might directly determine a fatal issue. Three clinical varieties might be described. The first was acute ileocolitis of sudden onset, with diarrhœa, mucus and blood

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* Summary of a Discussion by the Section of Pathology and Biochemistry of the British Medical Association, at Eastbourne, on July 23rd, in connection with the 1931 Annual Meeting. Reproduced from *The British Medical Journal,* August 8th, 1931. No. 3683.

usually, and clinical evidence of abdominal pain and tenesmus. The disease was due to local infection of the bowel and absorption of powerful bacillary toxins into the circulation. The second or fermentative diarrhœa was associated with acidic, gaseous, frothy, highly irritating, offensive stools causing excoriation of the skin. Dehydration was sometimes extreme, and the infant suffered from this combined with starvation and physical discomfort. It might arise from irregular feeding or overfeeding with carbohydrates and fats. The third was acute alimentary intoxication in which there was severe diarrhœa with watery stools, vomiting, general collapse, subnormal temperature, rapid feeble pulse, scanty urine, clammy skin, pallor, and sighing respiration. Many of the characters of this illness suggested acute anaphylactic shock, and in great probability the cause was of this nature. As a rule little morbid anatomical change could be seen in the bowel in any of these groups. In treatment first-class nursing was essential; the introduction of fluids to replace the excessive loss and the problem of feeding were the next concern. Blood transfusion was often invaluable.

Professor J. W. Bigger (Dublin) said that they were ignorant of much concerning the relation of *Br. abortus* to man, but there were some points about which they were certain. Epizootic abortion was common in cows; *Br. abortus* was common in cow's milk, and might occasionally cause undulant fever in man. He could not agree with Sir Weldon that failure to diagnose the disease was responsible for the comparative rarity of undulant fever in the British Isles; on the contrary, he believed that critical examination would throw doubt on the validity of the diagnosis in many cases. He based this view on the fact that the diagnosis of the majority of cases was made dependent on the agglutination reaction, which he regarded as a very uncertain foundation on which to erect a diagnosis. If they accepted any mild fever and a positive agglutination as diagnostic of undulant fever they would undoubtedly have many cases, but Professor Bigger did not regard this as legitimate. For diagnosis the isolation of *Br. abortus* was the ideal, and failing this only a typical clinical condition, together with a high agglutination, should be accepted. The agglutination titre of serums (submitted for the Wassermann test) against *Br. abortus* had been tested in two series. One was carried out by himself at a temperature of 54° C., and the other by Dr. A. H. Thompson at 37° C. In both series they found a much higher proportion of positive results than those observed in other countries. Professor Bigger had obtained 20 per cent. positive at 1 in 20, and Dr. Thompson 32 per cent. at 1 in 25. In one individual Dr. Thompson observed a rise in titre from 1 in 25 to 1 in 1,000, and a fall to 1 in 125 during a period when the patient was under constant medical observation, and yet exhibited no evidence of undulant fever. The speaker believed that the organism could invade without infecting, and so give rise to the appearance of agglutinins; but these cases or those with only a mild fever should have some other name. They should not be called undulant fever.

Major L. P. Pugh said that he had had a case of infection in a man caused as the result of using live vaccines in a herd of cows. The organisms in this particular case appeared to be more virulent than usual, since a number of the animals became ill following injection. The Ministry of Agriculture's policy of using live vaccines was, he felt sure, the right one on the score of its success in treating heavily infected herds, and particularly because it diminished the tendency to complications such as endometritis, salpingitis, and sterility. He was interested in Dr. Neale's description of ileo-colitis in infants, because it had its counterpart in young calves; it would be worth considering whether there might be a direct transference from calves to infants. The investigation of these diseases called for a closer collaboration between the medical and the veterinary professions.

Col. E. M. Perry said in his experience Mr. Rabagliati's estimate that 50 per cent. of the herds in this country were infected with *Br. abortus* was not an overestimate. He further pointed out that of infected herds from 30 to 90 per cent. of the individuals might be affected. This being so it was difficult to believe that ordinary strains of this organism were pathogenic to man. The usual method of entry of the disease into a herd was the introduction of a fresh beast which might slip her calf, or even carry it the full time and thus be a source of unsuspected infection. One or two abortions might occur during the first year, the number increasing during the second and third years, after which there was a dropping off until the herd became immune. The disease itself was a specific catarrhal metritis, and infection in the majority of cases resulted from the ingestion of contaminated foodstuffs.

Milk-borne Streptococcal Infections.

Lieut.-Colonel E. Wilkinson, I.M.S. (ret.), said he would deal only with scarlet fever and sore throat, quoting an epidemic of each. In the scarlet fever outbreak sixty-six persons were attacked in ten days, forty-four of them being attacked on the fourth and fifth days of the outbreak. At the same time about one hundred people were reported to be suffering from sore throat. All these persons were consumers of either milk or cream from an old-established firm of good reputation, and its premises, which included a milkshop, were clean. Hæmolytic streptococci of scarlatinal Type II were obtained from the throats of some of the patients and from the dairyman's son, who, in the early stages of the outbreak, suffered from a "rough throat" and later desquamated. In the sore throat outbreak members of over one thousand families were affected, and sixty-five deaths occurred. The primary illness was in most cases follicular tonsillitis (often severe) which was in many instances accompanied or followed by complications, mostly of a septic character. All the patients were consumers of milk from a particular dairy, which was exceptionally well equipped with modern appliances, its milk being obtained from a number of local farms. Samples of milk from each farm were taken, and one of them was found to contain abundant streptococci; when the use of this milk was stopped the epidemic ceased. The farm supplying this milk proved to be a model of its kind; some of the cows, however, had been suffering from inflammatory conditions of the udders. Cultures from the milk failed to establish a definite connection between the cows and the streptococci causing the throat infections. Some of the cows had been removed from the farm and could not be examined, so that positive proof was not established. In spite of this it seemed likely that when

the milk from this farm—alone of the many supplying the dairy—was stopped and the outbreak ceased, the infection of the milk was secondary to infection of cows.

Dr. R. A. Glegg (Lewes) observed that the second of the two outbreaks described by Colonel Wilkinson was of such magnitude as to call for special preventive measures. Medical practitioners could assist in tracing milk-borne infection if they ascertained and stated the source of milk supply when submitting throat swabs to municipal authorities. Representations had been made to the Ministry of Health to make compulsory the notification of sore throat and diarrhœa among persons employed in handling milk. Dairy farmers should be asked to post notices in their cowsheds asking employees to report if they or any of their families suffered from sore throat or other illness. The agriculture committees of the county councils should not be content to leave the inspections of the farms, dairies, and cows to the already overworked sanitary inspector, but should provide experts to assist him in this important part of his duties.

Dr. E. N. Davey said that he had seen two cases of undulant fever, and although unable to grow the organism he considered that an agglutination titre of over 1 in 125, an undulant fever chart, and leucopenia with relative lymphocytosis, provided sufficient data upon which to make a diagnosis. In three years' routine agglutination reaction of all serums submitted as possibly typhoid only three per cent. showed any reaction with *Br. abortus*. In a carefully guarded herd an outbreak had occurred apparently as a result of introducing a new bull, as the first three cows served by him had aborted, although there had been no previous abortions in the herd for the past eight years.

Dr. M. Maizels remarked that in infantile diarrhœa he found otitis media in 40 per cent. of *post-mortems*. He asked if the ears of all infants suffering from this condition should be drained. The administration of sodium chloride in these cases was not without risk, for it might displace the bicarbonate from the blood into the urine and increase the acidosis.

Dr. H. W. C. Vines said that as a result of this discussion it would appear to the general public that another nail had been heavily hammered into the coffin of fresh milk as a food, for it was becoming increasingly evident that this fluid was merely a suspension of more or less pathogenic organisms. He felt that it was becoming a matter of real urgency that the public should be given clear guidance whereby diseases such as those discussed might be avoided.

Sir W. Dalrymple-Champneys said, in reply, that he could not agree with Professor Bigger that any distinction could be drawn between invasion and infection. The agglutination test appeared to him, from the many hundreds of papers he had read, to be a reliable diagnostic method.

The New Minister of Agriculture.—The appointment of Sir John Gilmour to the Ministry of Agriculture is welcomed by farmers, particularly in Scotland, where he is best known. The new Minister is thoroughly conversant with the difficulties of the industry and, though he may have few opportunities of remedying grievances during the life of the National Government, farmers can be assured that an understanding man presides over the Department which intimately concerns them.—*The Times.*

Use of the Actual Cautery.*

By

Colonel J. A. McKinnon, U.S. Army Veterinary Corps.

One of the most useful instruments in veterinary therapeutics is the actual cautery. By this is meant the standard device, such as the ether auto-cautery, or other similar instrument, that has long been an article of issue, and is available at almost every post and station. It is also found, as a rule, in the kit of general practitioners everywhere.

This particular instrument frequently falls into disuse as the changing modes and tendencies in methods of treatment come and go, but it is invariably brought out again, after a time, and many indications for its use can be found in the average veterinary hospital, on routine cases, and when conducting the regular animal sick call. It must be remembered, of course, that such instruments are mechanical devices, often delicate in adjustment, and sometimes inclined to be temperamental in their functioning. Also, in the hands of the novice, they may be dangerous equipment, and capable of doing serious damage and injury to an animal, especially if we have forgotten some of the fundamentals of our regional anatomy, or fail to recall some of our basic surgery relative to the course that nature takes in wound healing, and the repair of damaged living structures and tissues.

The following brief list of conditions, in which the actual cautery may find some practical application, is set forth for consideration. It is not intended, in a brief paper of this type, to make the list exhaustive, or to go into minute detail, as the primary object is merely again to call to your attention some of the benefits to be derived from this article of equipment which is readily available.

Sitfasts.—These troublesome little fibrous, and epithelial, proliferations that occur on the backs, withers, and girths of both saddle and pack animals, while not especially disabling, as a rule, do produce discomfort for the animal at work, and not infrequently produce traits of disposition and an untractable nature that is not at all desired, especially in an animal used largely for pleasure. It is the usual thing to avoid surgical extirpation, and merely to apply some palliative measure and allow the animal to continue for months, or even years, with the same condition existing. It is true that surgical removal results in an excessive number of days lost from duty; that excessive adhesions and scar tissue formations may result, whereby in the end, the condition may not show any great improvement. The actual cautery is an excellent instrument to use in these cases. Using a medium point, and after shaving and disinfecting the area to be treated, a few small punctures are carefully made in the growth, not penetrating the sub-cutis, but just in the growth itself. The number of punctures will depend on the size of the area involved. The procedure is practically painless, bloodless, and clean. Only a few moments of time are required.

Following this treatment, a rapid absorption takes place, and with moderate sloughing around the punctures,

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* Reproduced from the *U.S. Army Veterinary Corps Bulletin*, vol. xxv, No. 3, July, 1931.

there is left a clean, quick-healing wound, from which the animal may be restored to full duty in a few days. The after-treatment is comparatively simple, in that only an occasional application of some emollient, such as wool fat, or petrolatum, is required.

Exuberant Granulations.—These granulations, or proud flesh, of wounds, occurring largely in wounds of long standing, or those in positions to receive continued irritation, are easily brought under control by the use of actual cautery. The reason, probably, that many do not have success with this method is the use of the cautery on the margins of the wound, where actual healing of the epithelium is under way. If the margin of the wound is cauterized it tends to become larger, and to stimulate the formation of additional capillary proliferations. Only the centre of these areas should be cauterized; thus when contraction takes place the margins are drawn toward the centre, tending to make the wound smaller.

Chronic Enlargement of Bones, Tendons, and Tendon Sheaths.—All are familiar, of course, with the usual technique and application of pin-point firing in the so-called spavin, splint, ringbone, and other osseous and tendinous conditions. Neglect or avoidance of this type of work may explain, in some degree at least, the widespread use of patent remedies that horsemen are prone to purchase and use in these various and sundry enlargements.

Using the regulation cautery, being moderate and conservative, and selecting the more slender points (also having due regard for the healthy surrounding tissues and structures) considerable progress may be made toward restoring these cases to duty—at least for limited service—without an excessive length of time on sick report.

The same is also true, but perhaps to a lesser extent, in the case of enlarged tendons, thickened tendon sheaths, and other allied conditions where the use of line, or feather, firing may be judiciously applied. Care must also be exercised in this type of firing in order that the skin circulatory function be not too extensively interfered with by applying lines that are too deep, or crossed. Disfiguring necrosis may result from work poorly done.

Warts.—These epitheliomatous growths (especially the smaller, multiple type) can be quickly removed with the cautery. In this case care must also be exercised in order that just the right amount of tissue is destroyed, and the surrounding healthy tissues not unduly stimulated.

Open Joints.—At rare intervals we may find joints that have clean punctures and are free from infection to the extent that the immediate closing of the synovial fistula is most desired. The actual cautery can be employed to accomplish this, in addition, of course, to such other remedial action that may be indicated. The use of the ball point over the open capsule, and pin points used over the adjacent tissues to produce the desired swelling, will sometimes produce results of a highly satisfactory nature.

Control of Hæmorrhage.—Not infrequently there may be surface hæmorrhages that are not easily ligated, and to which pressure cannot be easily applied, which the use of the ball, or hatchet, point of the actual cautery is all that is actually required to control.

Canker and Thrush.—The actual cautery works admirably in some selected cases of thrush and canker; especially has it been found useful in those cases that occur during wet seasons in the more tropical, or subtropical countries. Spongy frogs, and heavy proliferations that cannot be controlled by medicinal agents, may respond to searing from the actual cautery. Other indicated agents must be used with this method to obtain the best results.

History of "Foot-and-mouth" in England.

"Although there is good reason to believe that foot-and-mouth disease was unknown in this country before the last century, it probably has existed from time immemorial in Asia, and it appears to have prevailed at intervals in the epizootic form in Eastern Europe before its introduction into Great Britain," says *The Live Stock Journal* of August 7th. "Thus, in the sixteenth century it was described by Italian writers, and in 1686 and 1687 it spread over Germany and France. In the following century it had a wide distribution over the Continent of Europe, and numerous outbreaks of it are recorded.

"In the early part of the last century it was equally prevalent in Eastern and Middle Europe, but it was not until 1839 that the disease obtained a footing in Great Britain. In an article which once appeared in the *Journal* of the R.A.S.E., Sir John M'Fadyean recalled that the precise circumstances of its introduction here are not known, but during that year it speedily acquired epizootic dimensions among British cattle.

"The earliest reference to it in veterinary literature is found in the *Veterinarian* for 1839, where, under the heading 'The Present Epidemic Among Cattle,' Mr. Hill, a veterinary surgeon of Islington Green, described an outbreak in a dairy of 700 cows. Six of the cows were suddenly attacked 'with similar disease, the symptoms of which were precisely the same in each. The lining membrane of the whole of the mouth was in a state of inflammation and vesication. The tongue was involved, but the most extensive and annoying vesication was between the under lip and the gums. In two of the six it extended over the muzzle to the nostrils . . . . and peculiar symptoms accompanied this—a continual catching up and shaking of one or other of the hind legs.' These symptoms were at first attributed to some poisonous herbage; but that the disease was epizootic was soon made manifest, for in the course of about ten days more than 500 of the cows had been attacked.'

"Succeeding numbers of the *Veterinarian* contain other reports regarding the 'epidemic,' the contagious character of which was recognised, although the possibility of its originating under 'atmospheric agency' was entertained by many veterinary surgeons. Indeed, as late as 1857 Professor Simonds denied that foot-and-mouth disease was imported, and for many years afterwards this opinion was used to combat the efforts of those who held that the disease never originated spontaneously and ought to be opposed by measures calculated to stamp it out.

"From the period of its introduction till 1866 foot-and-mouth disease was never absent from Great Britain; but by the end of the latter year, apparently owing to the operation of the measures directed against cattle plague, this country was nearly free from the disease. The next few years, however, saw an alarming recrudescence of the plague, and in 1870 and 1871 over a million animals were reported to have been attacked by it. The Contagious Diseases (Animals) Act came into force in 1878, and the repressive measures which it introduced had almost eradicated foot-and-mouth disease by the end of the following year. Unfortunately, during 1880 it again began to spread, and in 1883 it affected nearly half a million animals. After that date it gradually declined, until in 1885 only one outbreak was reported.

"For the following six years the British Islands were free from foot-and-mouth disease, but in February, 1892,

Clinical and Case Reports.

Acute *Neuro-lymphomatosis gallinarum* in a strain of Rhode Island Red Fowls.

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Introductory Remarks.

In several previous papers (1928-31) I have recorded that each of three pathologically distinct fowl hæmopathies (transmissible anæmia = erythromyelosis; leucocythæmia; lymphocythæmia) frequently occur on farms in several hens of the same strain and that this familiar incidence had also been noticed in relation to some avian tumours. Since several extraneous causes can simulate parental transmission, further experimental investigation is still required before one can definitely state that these diseases of the blood forming tissues, tumours and tumour-like conditions are really hereditary or even congenital.

In fowls, " inherited infection " is well recognised; for instance, in bacillary white diarrhœa, due to the bacterium *Salmonella pullorum*, which can invade the fertilised yolk and unfold its pathogenic action a few days after the hatching out of the chick. This is obviously something different from the inheritance of characters connected with the germinal constitution, like size of combs, colour of plumage, etc. It appears reasonable to restrict the word " heriditary " to the transmission of parental or ancestral features which are present in the gonads and reappear in the progeny.

Apart from these general considerations, it has been ascertained that to obtain a clear conception of the pathology of many of these avian tumour-like conditions, it is necessary to determine the type of cell predominating in the lesions, and first base the pathological classification on this peccant element: its localisation and grouping are instead features which may usefully determine the clinical diagnosis.

The advisability of revising the nomenclature of such diseases according to the type of cell originally affected, has been confirmed by the study of sporadic outbreaks among poultry on farms, of morbid conditions belonging to the mixed group of avian lymphocythæmia and lymphomatosis, for gradual transitions occur frequently between both these otherwise so diverse ailments. Experimental support of the opinion that the cell of the lymphoblast-lymphocyte series is the primary pathological element of several clinically different avian ailments will be published later on.

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the disease was discovered among some Danish oxen in the Metropolitan Cattle Market. Notwithstanding the utmost vigilance of the Board of Agriculture, this proved the starting point of an epizootic during which in England and Scotland 5,267 animals were attacked. Rigorous isolation, supplemented in some cases by slaughter of the affected animals and of those that had been exposed to the contagion, had the effect of exterminating the disease by June, 1892.

" Since 1892 the importation of live cattle from countries in which foot-and-mouth disease exists has been prohibited, but nevertheless since that date the country has frequently been invaded by the disease."

At present it is intended to describe a third, apparently totally different disease, with alterations of the central and peripheral nervous system, which result in persistent paralysis of the limbs of young fowls. The lesions consist primarily of cells of the lymphocyte series; these seem to migrate from the circulation; it is accordingly suggested that the *causa morbi* may possibly reside in these cells.

Previous Observations.

This form of poultry paralysis was first recognised in Austria by Marek (1907), who distinguished the disease from the purely degenerative polyneuritis seen in pigeons and fowls fed on polished rice (Vitamin B. deficiency). Later, Van der Walle and Winkler-Junius (1924) described the disease in Holland; next year a preliminary report on similar lesions in the nervous system of fowls was made by May, Tittsler and Goodner (1925) in the United States. A description of the symptoms and pathology is that of Doyle (1926), followed by Pappenheimer, Dunn and Cone (1929), who completed a study of the pathology and decided upon the suitable and descriptive name of " *Neuro-lymphomatosis gallinarum.*" The possible relationship of the condition with lymphocythæmia was also considered, and it was noted that the agent which is responsible for the pathological changes, predominantly of the central and peripheral nervous systems, may stimulate the proliferations of lymphoid cells of the viscera.

These authors remark that " one of the puzzling facts which has made the experimental study of the disease very confusing and difficult, is the frequent occurrence of lymphoid infiltrations in the nervous tissue of chickens which are not paralysed and which betray no clinical evidence of disease."

Pappenheimer, Dunn and Seidlin (1929) performed numerous experiments and transmitted the disease to approximately 25 per cent. of the inoculated chicks. In the controls kept under laboratory conditions the incidence was about 7 per cent.

Seifried (1930) observed the disease in Germany and confirmed the experimental transmission of the disease through four series of fowls and showed that the " virus " could be preserved in glycerol during six months with slight loss of activity.

Since then this avian ailment has been recognised in this country by Galloway (1929), McGaughey and Downey (1930), Dalling (1931); moreover, Marginson and McGaughey (1931), following observations of numerous outbreaks, conclude that the principal method of spreading " fowl-paralysis " is through breeding from affected adult birds.

The latest addition to the knowledge of the geographical distribution of this disease is that of Hall (1931), who observed it in a Nigerian fowl.

Circumstances of an Acute Outbreak.

All these authors, with the possible exception of Seifried, appear to have observed the culminating symptoms of what must be a chronic process, judging from the size and microscopical appearance of the lesions in the nerves.

I have lately been able to observe an outbreak of what I consider to be acute *neuro-lymphomatosis gallinarum* in a small poultry farm with a stock of about 65 Rhode Island Red, six-months-old pullets, and about 100 White Leghorns of approximately the same age. The disease attacked only the Rhode Island Reds, which were pur-

chased as chicks from one source and presumably (but not certainly) belonged to one strain. None of the White Leghorns was affected, though they mixed with the Rhode Islands and partook of the identical food; this was a balanced mash from a reputable firm. The land on which the fowls were kept was an oblong piece about an acre in extent, fenced in by wire netting; the soil had not been used for poultry before, but was richly covered with weeds rather than grass. The hen houses were new and very well kept. In view of some of the symptoms which will be described, a search was made for poisonous plants or decaying matter.

Symptoms During Life.

When the disease became first noticeable the symptoms consisted of debility and listlessness—for the fowls affected did not run out when the doors were opened in the morning or, if they did emerge, appeared to limp or stumble. This was thought to be caused by the hens being harried by the cocks and later it was suggested that the food might be at fault and the birds were heavily dosed with cod-liver-oil. In spite of this the debility rapidly increased and paralysis of legs, wings and neck supervened, so that the fowls were unable to move and died within five days. Out of the 65, eleven became ill, seven died in the course of five weeks, whereupon the small-holder was alarmed and sold off the survivors; I purchased four of the chickens with severe symptoms.

These pullets presented an extraordinary appearance because, owing to a flaccid paralysis of the neck muscles, the beak was trailed on the floor of the laboratory as the chicken ambled or shuffled along, dragging its lame leg. Both wings were drooping and lifeless, the feathers were ruffled and appeared dull; but this superficial lack of gloss may have been due to the cod-liver-oil which had been spilt in the attempts to feed the hens with large quantities for therapeutic purposes.

The paralysed legs were soft, lifeless and possibly thinner than the healthier one, for in all instances observed only one leg was palsied. There was a definite difference of temperature between both legs, the paralysed limb feeling warmer. Iritis could not be detected, but there may have been avoidance of light. The birds were obviously ill and weak, fell down easily and remained lying or retired into a dark corner, crouched and hid their heads. Food was not willingly taken; loose white droppings were noticeable, but not real diarrhœic symptoms.

All muscles appeared to lack tonus, though the fowls could struggle vigorously if caught; no circular movements were seen—the course followed was irregular and apparently purposeless.

Examination of the Blood.

In view of the importance of hæmatology in the differential diagnosis of these diseases, particular attention was concentrated on the blood-picture, which was compared with that of fowls suffering from a more chronic form of the ailment from another farm, about 14 miles away. The following figures are the mean of the observation on the four fowls. Hæmoglobin on the Sahli scale: 50-55 (slightly lower than the "good average" (60). Erythrocytes: 2,800,000 (average). White blood cells: 31,000 (slightly increased).

A differential count gave the following result (actual figures):—

		Healthy Fowl.
Lymphocytes	18,000 ...	8-12,000
Monocytes	3,000 ...	2-2,500
Polynuclears	7,000 ...	6-8,000
Various immature cells ...	2,000 ...	About 500

All erythrocytes show picnotic nuclei with irregular edges and can be considered mature. There is a definite increase of cells of the lymphocyte series, which are accordingly responsible for the numerical increase of the white-blood-cell total.

The fowls were watched during one hour and then one was killed, whilst the three others were treated in the manner to be described under "Therapeutic experiments" and are still under observation.

Pathological Signs on Necropsy.

Necropsy notes. Vol 2. No. 18. *Date, July 16th,* 1931. Fairly well nourished Rhode Island Red hen, though undersized for its age (six months). Skin healthy, but pale; no external parasites found, except one *Menopon pallidum.* Comb pale, muscles on section pale and flabby: it is particularly noticed that the sternal ridge is bent, S-shaped; Liver: dark, firm, not enlarged, 40 g.; section uniform, glistening. Spleen: round, smooth, uniformly enlarged, 6 g.; section pale, regular. Kidneys: dark, firm; appearance and section do not reveal gross lesions. Crop empty; in the gizzard a few undigested wheat grains and grass blades are found; no offensive or cheesy odour. Intestines throughout pale, empty, appear somewhat thickened; duodenum contains *Davainea proglottina*; Cæca, *Heterakis papillosa*; no other helminths found. Trachea searched for gapeworms, cæca and intestines for coccidia; none detected. Pancreas: somewhat pale. Heart: firm, red. Lungs: pink, healthy. Ovary: small and undeveloped; oviduct not yet patent. Femora: easily cut open, marrow mottled, equally distributed red and yellow. Sciatic nerves exposed; not irregularly hypertrophic in any portion. Search for increased thickening of nerves on issue from chord yields negative results, since there is no obvious difference in size between left and right. Skull: bones relatively easily cut; brain and cord appear pale, grey, anæmic; no punctiform hæmorrhages. The gross anatomical diagnosis is therefore uncertain.

Microscopy.—The brain, peripheral nerves and bone-marrow show, to my mind, the essential and pathognomonic lesions of the disease. Brain: the first striking feature are lymphoidal "cuffs" around what appears to be dilated lymphatics and in some instances thin arterioles of the cortex; this morbid alteration occurs somewhat irregularly, but is easily detected even under low power. Analysis of the cellular make-up of these cuffs shows them to consist mainly of a round cell with a relatively clear nucleus and scanty cytoplasm, appearances which agree with those of a lymphoidal cell. There are also cells which originate from the vascular endothelium and a few of these are actually undergoing a process of mitosis; in addition, glia-cells, recognisable by their clear, sharply defined oval nucleus, are present in small numbers, evidently as the result of reaction from the supporting tissues of the cortex. It is noted that in some instances these cuffs are contained within an outer endothelial lining, whose origin remains obscure. The arterioles are on the whole somewhat thickened and when this is the case no lymphoidal cells are present in the perivascular spaces.

The nerve cells of the cortex show frequent signs of injury and partial disintegration; both are characterised by cloudy swelling of the cytoplasm and incipient neuronophagia by glia-like cells. Though all these appearances are very similar to those seen in certain " virus " diseases, no reaction bodies can be detected. These microscopical features of acute neuro-lymphomatosis are probably due to interference with the nutrition of the cortex as the result of the abnormal thickening of the lymphatic endothelium.

Peripheral nerves, *e.g.*, sciatic: In the spaces between the nerve fibres, relatively frequent slender fusiform accumulations of lymphoid cells. These have pressed on the nerve axis and interfered with its function. These lesions are therefore distinguishable from those seen in fowl-polyneuritis as the result of lack of vitamin B, in which primary degeneration of the neural axis is present. These alterations differ in degree from the chronic conditions described in the peripheral nerves by Pappenheimer and his co-workers, who describe an intensification and scattering of the cellular aggregates. A more accurate and detailed examination of the nervous system of these fowls is now being undertaken, particularly to bridge over the differences between the acute and chronic lesions of the disease.

Bone-marrow: this shows peculiar and striking lesions, which quite possibly indicate the origin of the condition. They consist in a thick fringe and groups of lymphoidal cells around islets of newly-formed osteoid tissue. Erythrocytopoïesis is scarcely evident and the type of cell and its disposition render these lesions of the blood-marrow clearly distinguishable from those occurring in erythromyelosis and leucocythæmia.

Liver: the inter-acinary spaces are frequently occupied by congregations of lymphoidal cells, whose irregular size and disposition differentiate them clearly from the well-known lymphoid groups which are found in the liver of every fowl; these massive accumulations of lymphoid cells are obviously pathologically increased. Spleen: diffuse hypertrophy, recognisable by the hyperæmia of the tissues, the frequency of newly-formed capillaries and the presence of strands of young connective tissue.

The duodenum shows *Davainea proglottina in situ*; the villi are well preserved and there is an excess of lymphoidal cells in the intervillar spaces. Muscular and connective tissue layers well-developed.

Differential Diagnosis.

The lesions of the brain and nerves are considered to be due to an acute form of *Neuro-lymphomatosis gallinarum*. It is admitted that further confirmation of the findings of this single outbreak is desirable, with observations on the living fowl, within its natural surroundings and accurate and compared microscopy of the lesions.

Concurrently with this acute outbreak, the chronic form is being observed in fowls from other poultry farms. Here the symptoms agree more closely with what may be called the classical type and which has been amply illustrated by Pappenheimer and others. The fowls are unable to stand, one leg is stretched in a condition of spastic paralysis (as distinct from the flaccid type seen in the acute variety of the disease), the claws are drawn up and bunched; irregular neural swellings can be detected through the atrophied muscles of the thigh; one or both wings droop, there is that cloudiness of the iris which has been described as iritis by some authors, though it is not an inflammatory process, but the result of lymphoid infiltration. Both Rhode Island Reds and Wyandottes have been obtained in this condition and a description of the lesions will follow in due course.

Previous to these outbreaks, carcasses of fowls had been received from different farms with reports of paralytic symptoms; these instances occurred sporadically. Usually paralysis was due to obvious causes, like long-standing impacted yolks, internal tumours pressing on nerves and among chicks of 6-8 weeks, nutritional errors. An accurate description of the symptoms during life was not obtainable and therefore these fowls can only be mentioned as proof of the contention that before diagnosing paralysis of the leg or wing in fowls as due to acute *neuro-lymphomatosis gallinarum* one should exclude other causes and ascertain whether the birds belonged to one strain and that of a susceptible age, four to seven months, and eventually base the diagnosis on microscopical lesions. On the other hand, the chronic form, with its neural swellings, lymphocytic deposits in the liver and kidneys, frequently enlarged spleen (as much as 20 g. in one case), increased lymphocytic count in the blood, etc., should not present unsurmountable diagnostic difficulties, yet I have seen *neuro-lymphomatosis gallinarum* labelled as " mild coccidiosis," " limberneck = botulismus " and even " lead poisoning."

Coccidiosis, mild or otherwise, was not present in these fowls, but it must be admitted that Beach and Freeborn (1930) state that in California a " high percentage " of pullets with paralysis have been found affected with chronic coccidiosis. On the other hand, Pappenheimer (1929), as the result of careful observations, affirms that there is no correlation whatever between infection with *Eimeria avium* and the incidence of neuro-lymphomatosis.

Limberneck or botulismus is a well recognised cause of death among fowls in parts of the United States; Bushnell (1929) reports from Kansas 108 outbreaks of botulism in a total of 7,886 outbreaks of common diseases, involving a grand total of 16,322 birds examined. In Gerald Leighton's book on Botulism, facing p. 129 are photographs showing the devastating mortality in fowls caused by the bacterium *Clostridium botulinum* in California. The symptoms of limberneck described in Bushnell and Brandly's excellent book are those of the fowls seen in this outbreak, except that pieces of decomposed meat or putrid odour of the crop content were absent on necropsy. The microscopical lesions of fowl-botulism do not appear to have been described, but since those found in my fowls in the blood during life and in the brain, peripheral nerves and bone-marrow after death, agree with those repeatedly described by competent observers in neuro-lymphomatosis, the differentiation should not cause great difficulty.

For the diagnosis of lead poisoning one has only observations on mammals to serve as a guide, but it may be assumed that in fowls there would be distinct digestive disturbances, and typical alterations of the red blood corpuscles, intestine and liver cells.

Diagnosis and Pathogenesis.

These observations on the field and in the laboratory seemed to justify the conclusion that this was an acute

outbreak of *neuro-lymphomatosis gallinarum*. The reasons which determined the diagnosis are :—

(1) The microscopical lesions in the brain, medulla and peripheral nerves; these correspond closely in type to those described by Marek, Pappenheimer, Dunn and Cone, Seifried, Galloway.

(2) The clinical symptoms, which though more intense yet corresponded in general features and in prevalence to those described and illustrated in this disease, particularly by Niemann (1928), Seifried (1930).

(3) The age of the fowls affected and the selective nature of the outbreak.

It is admitted that the naked-eye lesions, particularly the lack of definite swelling of the nerve roots, did not quite conform to what has been described by others; still, it cannot be expected that perineural thickenings up to one cm. in diameter can develop in a week or so.

The pathogenesis of the ailment is still obscure; one can admit, after the experimental work of Pappenheimer, Dunn and Seidlin and that of Seifried, that a " virus " or microplasm causes the lesions, also that its presence is linked with certain fowl strains *ab ovo*; but the inciting cause (the one which makes the pathogenic agent unfold its action) can only be surmised, for it is but to be expected that there may be several, both nutritional and parasitic. Niemann (1928), who found no more than 11 fowls with coccidiosis among 93 with paralysis, discovered " cæcum worms " in 55 and " tapeworms " in 42; obviously a high proportion. I should like to call attention to the presence of *Davainea proglottina* in the fowl examined. Kotlán (1925) identified this cestode in all but one of 13 fowls with "leg weakness." It well may be that intestinal parasitism is capable of acting as a predisposing or precipitating cause of neuro-lymphomatosis, but that this form of paralysis is primarily a disease allied to those produced by a progressive proliferation of the lymphocyte forming tissues, as witnessed by the frequent lymphocytic deposits in all organs, not the nervous system alone.

Therapeutic Experiments.

The three fowls presenting the symptoms of acute and severe neuro-lymphomatosis described under the heading " Symptoms during life " were fed by hand with chopped lettuce leaves; next day they appeared to be more lively, attempted to stand, but were still partially paralysed; fed again with lettuce, and within 48 hours they were able to hold their heads erect and walk straight; they then fed spontaneously and are now under observation, two apparently recovered. One, a cockerel (No. 173) relapsed after five days with the same but less acute symptoms and remained paralysed during four days in spite of feeding with lettuce and baker's yeast; the feeding was continued and he then recovered slowly within further five days and is now again able to walk, though rather stiffly.

These results were so remarkable that it was decided to control and confirm them if possible, on a larger number of paralysed fowls. Thirteen fowls with paralytic symptoms were obtained from five different sources. One of these, a White Leghorn hen, proved to be suffering from chronic coccidiosis and was killed; another, a Wyandotte, had a large tumor of the left thigh, the accurate diagnosis of which is still outstanding; both of these did not improve under treatment. The remaining eleven cases in Rhode Island Reds were diagnosed as various stages of sub-acute or chronic neuro-lymphomatosis; none of the fowls could stand, two in addition exhibited paralysis of the neck-muscles and difficult deglutition. One of these semi-comatose birds died, notwithstanding treatment, and on necropsy was found to have typical swellings of the left sacral plexus and sciatic nerve. The others on being fed by hand with chopped lettuce leaves, within five days or a week began to eat spontaneously their mash and skim milk; they then stood up and walked a few steps at a time and five out of ten have made such further progress as to lead to hope that their recovery will last.

It is conceded that the number of cases is perhaps insufficient to allow a final conclusion. Moreover, improvements and relapses have been observed in these conditions, though McGaughey (1930) states: " At present there is no evidence that clinically-affected birds may recover, but as Pappenheimer, Dunn and Seidlin (1929) found microscopic lesions in the central nervous system of apparently normal birds, it is probable that many birds are affected but show no clinical signs."

In all these eleven fowls the paralysis was obvious, and evidently where gross anatomical lesions are present, complete recovery seems scarcely possible. The varying results obtained may indicate an essential difference between acute and chronic neuro-lymphomatosis, corresponding to the degree of the anatomical lesions. The relapse seen in one instance may be considered further confirmation that this disease is not akin to botulismus or other similar bacterial intoxications*.

Hygienic Suggestions and Preventive Treatment.

It has been mentioned that the small-holder who discovered this visitation in his flock of chickens sold the affected strain in the open market. This, to my mind, is an unjustifiable course, for it is thus that the disease is being propagated.

In a paper by McGaughey (1930) it is recommended that all affected birds should be destroyed as soon as they are detected and that the infected premises should be thoroughly disinfected. It should, however, be remembered that these diseases allied to the " hæmopathy " group are not infective in the commonly accepted meaning of the word; transmission under experimental conditions is by no means easy and then succeeds only in fowls of the same strain. The accumulated appearance of several cases is usually the outcome of close inbreeding, accompanied by an accessory frequent stimulus, usually of a parasitic nature. (Bayon, 1930).

As a logical outcome of observations made during the last year, which show that the acute onset of the disease is exceptional, I have ventured to suggest to a poultry farmer, who was willing to take advice and in whose flock a certain strain was developing several cases of chronic neuro-lymphomatosis, the following course of preventive treatment :—

(1) Segregate the flock, examine all fowls and cull out those showing symptoms of weakness; kill the weak fowls —they are usually fit for human consumption.

* These notes were already in proof when Dr. W. E. McCulloch brought to my notice that in 1930 he had published in a paper the beneficial effect of lettuce feeding in " leg-weakness " of fowls.

(2) Mix good, fresh, tasty green food with the wet mash.

(3) Observe the remaining fowls at short and regular intervals, noting any symptoms of limping or loss of appearance.

(4) Do not breed from the eggs; gradually kill off the strain.

Summary and Conclusions.

(1) An acute outbreak of *neuro-lymphomatosis gallinarum* was observed in a small holding among 65 R.I.R. six-month-old pullets. Eleven were affected, of which seven died; one was killed for microscopical examination, three improved considerably after being fed with lettuce, but one relapsed after five days and recovered again later; these and ten control fowls are still under observation: of these ten controls five have definitely improved.

(2) The differential count of the white blood cells exhibited a definite increase of the cells of the lymphoid series, apparently originating in the marrow, in which corresponding lesions were found.

(3) The diagnosis was based on the microscopical examination of the brain, peripheral nerves and inner organs. Particularly the cerebral cortex showed peri-vascular "cuffs" of cells of lymphoid origin and the sciatic nerve spindle-shaped accumulations of similar cells. In the liver, spleen, kidney, intestines scattered and increased groupings of lymphoid cells were easily detected.

(4) The peri-vascular cuffs surrounding distended lymphatics in the cortex consist mainly of cells originating from the circulation with a small admixture of endothelial and glial cells. It appears therefore that this disease belongs anatomically to the pathological group which comprises both lymphocythæmia and lymphomatosis, but with the clear distinction that the most striking effects are due to lesions localised in the central and peripheral nervous system.

(5) The name "*Neuro-lymphomatosis*" is preferable to those which do not clearly indicate the pathogenesis of the principal lesions.

(6) This outbreak differed from others published and seen because the acute disease not only produced more intensive symptoms such as neck-paralysis, but did not exhibit the gross lesions seen in the more chronic course, such as swellings of the peripheral nerves, diffuse cerebral alterations, striking tumour-like deposits of lymphoid cells in the inner organs and tissues.

(7) In this and other outbreaks the disease was restricted to the progeny of certain strains, though the symptoms developed about the age of six months.

(8) *Neuro-lymphomatosis gallinarum* appears to be spreading owing to the prevalent habit of "disposing" of the flock once the ailment is recognised.

(9) Hygienic measures and preventive treatment are discussed.

It is a pleasant duty to acknowledge the advice and encouragement received in these investigations from Professor Basil J. Buxton, F.R.C.V.S., and the Staff of the Institute of Animal Pathology of the University of Cambridge, particularly Mr. T. J. Bosworth, B.Sc., D.V.S.M., and Mr. R. E. Glover, B.Sc., M.R.C.V.S.

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Horses Poisoned by Bryony.

By

W. E. Blackwell, M.R.C.V.S., Towcester.

While glancing through a very useful little book, entitled "Poisonous Plants of the Farm," by Long, I came across this statement, under the heading "Bryony": "No deaths of domestic animals from eating this plant have been noted, yet animals might conceivably eat it in times of scarcity."

I thereupon decided to collect my notes, and record at least three fatal cases of poisoning by bryony, which had come under my observation. It is rather a remarkable fact that horses, cattle and sheep will eat poisonous plants, with fatal consequences, even when the pastures are plentiful. I think poisonous plants are responsible for many deaths which are diagnosed as being due to other causes. I hope the following three cases will be of interest, and help to focus more attention on bryony as a not infrequent source of misfortune in this connection. Only a week ago a farmer showed me part of a plant he had taken from the mouth of one of his cows: it was bryony.

Case 1.—*July*, 1930.

Subject.—A heavy draught horse, brought up from

pasture on Wednesday morning. He had lain out all night after working the previous day. The animal refused his feed and would not drink. When I saw him a little later he was standing quietly and was very dull. His temperature was 103° F., his breathing shallow and accelerated, and pulse fast and weak. The horseman told me " he dungs just like a cow " and his membranes were injected. I could find no indication that the horse had been rolling. I treated him for subacute inflammation of the bowels and began to wonder what might be the cause of it. There was very little change in his condition during the whole of that day.

Thursday morning.—The temperature was 105° F. Mouth dry and very fœtid; pulse imperceptible; breathing unaltered; anxious expression.

Thursday evening.—Horse died 8 p.m., after being in violent and continuous pain, accompanied by profuse perspiration, for two or three hours.

Post-mortem.—The bowels presented a very striking appearance, resembling a barber's pole. Gastro-enteritis was intense and strips of dirty, yellowish-green and gangrenous bowel alternated with the deep crimson shade of the intervening parts. This was particularly noticeable in the small intestine. These strips had terminal points, like so many arrows.

Friday morning.—The owner and I walked round the fields where this horse had been pasturing. We found a place where the hedge had been pulled and this particular plant was hanging down touching the ground. The stem, leaves and berries had all been partaken of. Professor Wooldridge, from the ingesta, very kindly identified the plant as bryony.

Case 2.—*October*, 1930. *Sunday morning.*

Subject.—Aged Welsh pony, mare. She was brought to the surgery, a distance of one mile. Owner reported dull pain and lassitude. Temperature 102·8° F. Bowels torpid. I saw her three times that day, treating her for intestinal stasis, and subacute inflammation of the bowels, but in spite of everything I could do for her she remained just about the same, and the bowels did not act at all.

Monday morning.—Pains rather more severe, yet not violent. No dung.

Monday evening, 7 p.m.—Subacute laminitis, all four feet. Temperature 104° F.; pain less severe. Pony died 10 p.m.

Case 3.—*July*, 1931. *Thursday, 10 a.m.*

Subject.—Aged Welsh pony mare; same owner as Case No. 2. This pony had been grazing in the same field from which Case No. 2 was brought to me the previous October. This fact impressed me and I informed the owner at the outset that I thought there must be some connection between these two cases, and also that this pony had, in my opinion, been poisoned either by accident or design and that if we could elucidate the cause of the trouble in this case, it would in all probability explain the origin of his other one. She was in dull pain and seemed to prefer the recumbent position. No sweating, bowels torpid; temperature 103·8° F.; pulse fast and very weak.

6 p.m., same day.—Appreciably worse; sweating, rolling; pulse imperceptible. I gave the opinion that the pony would not live until 10 p.m. She died in great agony at 8 o'clock that night. I obtained the keys from the owner and proceeded next morning to make a search of his field. He had by that time made up his mind that somebody must have poisoned his ponies, and done this for spite. I explained to him that I had known of such instances, but must make reasonably certain before proceeding on that hypothesis. I searched the hedges carefully and the banks of the stream. I began to fear that what he suspected would have to be the only explanation, when, to my great relief, I came across a thick garland of bryony, entwined over and through the thorn hedge, spreading its foliage fresh and green and even invitingly. I examined it closely. There was unmistakable proof that the pony had eaten of it. I took the broken stems and some loose berries to the owner and explained to him exactly what had happened, and advised him to cut the plant out at once as this field was the only one he had.

There is a similarity between these cases which is rather striking. In this part of the country there are no stone walls dividing the fields (as one sees in Yorkshire and Derbyshire) and the hedgerows, though very pretty and less expensive to build in the first place, have yet quite a lot to answer for when tales of this kind can occasionally be extracted from their silent beauty and fragrance.

Abstracts.

[**Jewish Method of Slaughter.** Professor Barrier. *Bulletin de l'Académie Vétérinaire de France.* Vol. vi. No. 4.]

Members of societies for the protection of animals, and perhaps also religious adversaries, having for some time attacked the slaughter of animals for food according to the Jewish method, Professor Barrier, at the request of Dr. Netter, of the Academy of Medicine, has recorded his opinions on the subject, stating at the outset that it is not a question of the best method but only of showing that there is no reason to prohibit it. Wherever Jews are numerous the procedure is sanctioned except in Switzerland, where, since 1892, it has been prohibited for reasons urged by religious promptings or inspired by an ignorant sentimentality.

In this method the animal is laid on the right side either by casting or by the table apparatus. The head is now maintained in extension and resting on its front, thus tensing the tracheal region and rendering the parts accessible to the operator who, holding a long and extremely sharp knife in one hand and further tensing the skin with the other, with one stroke across the throat down to the vertebræ divides skin, throat muscles, trachea, œsophagus, jugulars, carotids and vagus, recurrent and sympathetic nerves. There immediately follows an enormous efflux of blood. The assistants should firmly control the head and limbs until the animal becomes inert—usually in five minutes. During the bleeding there are strong convulsive and respiratory reactions; in exceptional cases these may be absent; they, however, greatly help to render anæmic the flesh and viscera and are exclusively reflex movements, not preceded by consciousness, though ignorant and emo-

tional onlookers are apt to interpret the movements as those of defence in an animal sensing danger and trying to avoid it.

For consciousness to be maintained the cortex of the brain needs the afflux of abundance of normal blood at a certain temperature and pressure—a condition rendered impossible by this method of slaughter.

Sheep and calves are mostly killed by cutting the throat without previous stunning and no one urges the suppression of this procedure—a fact which makes one sceptical as to disinterestedness of the adversaries of the Jewish method.

It is to be remembered that the conservation of the meat is facilitated by the method. In discussing the communication, M. Martel mentioned that in 1908 he had received a note from Professor Chauveau containing the statement that the Jewish method provoked absolutely no pain and that, in consequence, its prohibition was not called for.

W. R. D.

[The Presence of Foot-and-mouth Virus in Vaccine Lymph.

HEELSBERGEN, T. VAN, *Ann. de l'Inst. Past.*, May, 1931. p. 558. Ex. *Brit. Med. Jour.*]

The author relates how, at the beginning of last year, some vaccine lymph coming from the State Vaccine Institute in Norway was used by Slagsvold to inoculate some cattle. Besides developing vaccinia, these animals showed signs of foot-and-mouth disease, and other animals in contact with them contracted this disease. Guinea-pigs inoculated into the paws with the vaccine lymph developed typical symptoms of foot-and-mouth disease, showing clearly that the vaccine itself must have been contaminated with the foot-and-mouth virus. The present author now describes experiments made by himself on this particular strain of vaccinia. Inoculation into a calf gave rise to a severe attack of foot-and-mouth disease, followed later by the appearance of vaccinia pustules. A second calf inoculated from the fluid in the vesicles developed foot-and-mouth lesions without any subsequent vaccinia lesions, indicating that the vesicular fluid did not contain the vaccine virus. In this way the foot-and-mouth virus was obtained in pure culture. A pure culture of vaccinia virus was obtained from the original contaminated vaccine by passage through cocks, the inoculations being made on to the comb. In two out of four birds a mild pustular eruption occurred, and material from these pustules inoculated on to the abdominal skin of a calf gave rise to typical vaccinia without any foot-and-mouth lesions. The purity of both strains was demonstrated by rabbit inoculations, and by cross-immunity experiments on calves.

In his report as Acting County Medical Officer for Suffolk, Dr. A. M. Critchley says:—"In the Newmarket district the training and breeding of racehorses is the only industry which seems to have any particular unfavourable influence upon the public health. A man occupied in this trade appears to be very prone to pulmonary tuberculosis, probably on account of the perpetual underfeeding and intensive training necessary to keep his weight under a certain limit. As a result the death rate from tuberculosis is higher in Newmarket than in West Suffolk as a whole or in any other town of the country."

N.V.M.A. Divisional Report.

Royal Counties V.M.A.

A Memorable Meeting at Aldershot.

The members of the Royal Counties Division, on the occasion of their summer meeting, which was held on Friday, July 31st, 1931, spent an afternoon of quite exceptional professional interest and social enjoyment as the guests of the President and members of the Aldershot Command Veterinary Medical Association.

A varied and most attractive programme had been prepared for the delectation of the Society, but a few minutes at the commencement of the proceedings were devoted to the business meeting, which was held in the Library of the Royal Army Veterinary School and at which the President of the Division (Major G. W. Dunkin) supervised the small amount of necessary business. Before the meeting dispersed, however, the PRESIDENT took advantage of the opportunity thus presented to convey to Mr. George P. Male, Hon. Treasurer of the Society, the heartiest congratulations of his fellow members upon the conferment upon him of the highest honour within the bestowal of the profession—that of election as President of the Royal College of Veterinary Surgeons. Every member of the Division, said Major Dunkin, was well aware of the supreme worthiness of Mr. Male to occupy that exalted position, which at the same time afforded unexampled opportunities in the service of his profession, which service their new President was eminently qualified to give.

Mr. G. P. MALE thanked Major Dunkin and his Royal Counties confrères for their congratulations and the mark of confidence which they embodied, which it would be his highest ambition to justify.

The minutes of the previous meeting of the Division, which had been published in the *Veterinary Record,* were taken as read and were confirmed and signed.

Correspondence.—From the following members, apologising for their inability to attend the meeting:—Messrs. Andrew Barr, A. J. Baxter, A. J. Beeson, Professor J. B. Buxton, Messrs. John Carless, F. W. Cundell, C. H. Ducksbury. C. Elphicke, Major J. J. Dunlop, Professor F. T. G. Hobday, Captain T. M. C. Hunt, Mr. G. E. King, Major H C. Jagger, Dr. P. P Laidlaw, Major Harry Lepper, Mr. Thomas Lepper, Captain W. L. Little, Mr. J. McKerlie, Colonel G. Rees-Mogg, Messrs. H. L. Roberts, S. Slocock, G. S. Sutton, F. T. Trewin, Captain S. Villar, Mr. J. Willett, Mr. D. E. Wilkinson, Captain E. C. Winter and Captain D. Wyllie.

(2) From Mrs. R. C. Catmur, thanking the Secretary for the letter of sympathy he had sent, on behalf of the members, in the death of Major Catmur, and stating that one of his greatest regrets during the last few years was his inability to continue his work for the Royal Counties Veterinary Society.

Obituary.—The PRESIDENT said that, in reference to the last item of correspondence, it was his painful duty officially to inform the members of what was already known to them—that since their last meeting not only their Association but the whole profession had sustained a severe loss in the passing of Major Robin Catmur.

While his health allowed, Major Catmur had rendered them able and devoted service in the capacity of Honorary Secretary and, as Mrs. Catmur's letter testified, his interest in the work and progress of the veterinary society for which he had done so much was maintained to the last.

He asked the meeting to stand in silent tribute to the memory of one whose death left a very real gap in the ranks of the Royal Counties Division and of the veterinary profession.

The members stood for a few moments in silence.

Next Meeting.—It was agreed to hold the next (November) meeting of the Division in London.

Sir Frederick Smith Memorial Fund.—The members voted the sum of two guineas to this Fund.

The business meeting concluded with an explanation from the President that, although he had been appointed as the Division's representative to the recently-held Congress of the Royal Sanitary Institute at Glasgow, he had not then returned from his recent visit to America, and had, he regretted to say, been unable to find a substitute.

Demonstrations.—After assembling at the Royal Army Veterinary School, the members were conveyed to the Station Veterinary Hospital, where they were shown (by Major G. Kelly, R.A.V.C.) a selection of horses illustrating the types used in the various mounted branches of the Army. These included Horse Artillery, Field Artillery, Pack Artillery and Cavalry. The team of brown horses of "M" Battery, R.H.A., shown with gun and limber, were much admired.

The visitors were then conducted round the Hospital stables and buildings where a horse was thrown and secured for operation in the theatre. A demonstration of passing the stomach tube was given by Major J. Bell, R.A.V.C.

Major C. A. Murray, R.A.V.C. showed two cases of navicular disease which had been treated by "blocking" the plantar nerves with absolute alcohol. This method of unnerving is claimed to have advantages over ordinary neurectomy.

Major E. S. W. Peatt, R.A.V.C., exhibited a case of tetanus which had been subjected to the forced exercise treatment and which made a complete recovery after three weeks.

The members also inspected the loose box fitted with a roof of Vita-Glass. This glass was fitted as an experimental measure to test the effect of the ultra-violet ray on all types of veterinary cases.

The company now adjourned to a marquee on a lawn adjacent to the Veterinary School, where they partook of tea as the guests of the Aldershot Command V.M.A.

The President took the opportunity thus presented, of observing that he was quite sure they would not wish that social gathering to break up without an expression of their grateful thanks to Colonel Mosley and the other officers of the Aldershot Command who had so kindly entertained and instructed them that afternoon. They had more or less wound up with that pleasant interlude, and now they were to have the privilege of listening to Major Pryer. The members of the Royal Counties Veterinary Medical Association were deeply indebted to Colonel Mosley and his brother officers for the delightful programme which had been arranged and so successfully carried through on their behalf. (Applause.)

Colonel H. S. Mosley, in the course of an eloquent acknowledgment of the warmly-accorded vote of thanks, said that he was sure it had been a very great honour and pleasure for the members of the Aldershot Command V.M.A. to greet their friendly and distinguished neighbours—the Royal Counties V.M.A. They were not greeting strangers, but colleagues and, indeed, something more than colleagues, for so many of their guests that day had R.A.V.C. associations that they felt they were greeting old comrades. (Hear, hear.)

It was also a very great pleasure to them to see their Colonel-Commandant, General Sir Layton Blenkinsop, and also Major-General Sir John Moore and other brother officers who had come there to support them. At the same time they were very glad to welcome the officers from Weybridge: it was one of the Aldershot Command Association's regular annual outings to go to see the laboratories there.

He thought the secretaries of both societies—the Royal Counties and their own—Mr. Bell and Major Pryer—deserved their thanks and gratitude for bringing that meeting into being. (Applause.) Meetings of that character, in which they had representatives of all branches of the service, could not but promote greater sympathy between them and effect a closer liaison in the work which would prove of benefit not only to the profession but also to the State. (Hear, hear.) They were, indeed, very pleased to see them.

Continuing, Colonel Moseley said that he thought that everybody who was, or who had been, acquainted with the Army Veterinary Service realised that it was a special branch of veterinary medicine. They were birds of passage: here in England their work was solely confined to horses and the diseases of horses, but when they went abroad they had all classes of animals in their charge, while they were confronted with the problem of knowing the veterinary situation in every possible centre of operations. With it all, however, it was a good life, and if there was any young member of the profession who wanted to have an opportunity of studying tropical diseases, he was sure he would have a very good opportunity by joining the Royal Army Veterinary Corps.

The veterinary hospital they had just seen was not on the best site, but it was the best they could get. The success of the hospital was due to team work. It had been going 25 years, and during that time they had had as many as 12 commanding officers.

Despite the inroads of mechanisation, continued Colonel Mosley, they had in that one command 4,000 horses, so that there was still something for them to do. That school was divided into three classes—educational, research and productive; in the last-named respect it was of interest to remember that at one time the School Institute made vaccine for the whole of the Army and Navy.

Their guests had that day seen their horses and had observed their type and condition. In 1914 they prided themselves on the standard of their horsemanship; they had more reason to pride themselves thereupon that day, because during the War everything went down to absolute bedrock. It had gradually got back to that proud position of which he had spoken, and the chief credit

was due to the school, which had been the centre of much effective, unassuming work, and also to the veterinary officers in charge of the unit. (Hear, hear.)

All the officers of the Aldershot Command were very pleased that the Royal Counties Society had come there that day; in particular were they delighted to have the opportunity of congratulating Mr. G. P. Male upon his election as President of the Royal College of Veterinary Surgeons. It was gratifying to them all that the Presidents both of the Royal College and of the National Veterinary Medical Association had honoured their meeting with their presence that day. (Applause.)

The President of the Royal College of Veterinary Surgeons (Mr. G. P. Male) observed that he would like to say how much he appreciated the very kind congratulations of the President and members of the Aldershot Command Veterinary Medical Association. He merely desired to add how delighted he had been to come there that day and see all the many interesting things that had been shown them; also to meet so many members of the R.A.V.C. and to have, in every way, such a delightful afternoon.

Paper.—Following this refreshing interlude, the company adjourned to the School, where, with much interest and great appreciation, they heard Major A. A. Pryer read a paper entitled "The Use and Limitations of X-rays in Veterinary Practice," illustrated by a selection of excellent X-ray films converted into lantern slides. Professor Wooldridge opened a useful discussion. [Both paper and discussion are reproduced at the commencement of this issue of the *Record*.—Ed.]

An interesting and appropriate prelude to the paper was the staging of a demonstration of the X-ray examination of the navicular region. The large number of onlookers precluded the examination being carried out in the X-ray room and the apparatus was brought into the open air for the occasion.

It was explained that it was asking a great deal of any horse to expect it to approach the X-ray tube, adopt the required position, and remain motionless during exposure, whilst surrounded by 70 spectators, but fortunately the patient proved amenable and standard pictures of both fore feet were taken without any hitch or delay. The technique employed was as follows: —

An X-ray film was placed between intensifying screens and inserted in a reinforced aluminium casette in the dark room. The horse, whose feet had been cleansed and prepared in the manner described subsequently in Major Pryer's paper, then stood upon the casette. The filament light of the tube was directed on to the pyramidal process of the os pedis at a distance of 26 inches and an angle of 60°, and an exposure of 1½ seconds was given.

Vote of Thanks.—Major-General Sir John Moore said that the very pleasant duty devolved upon him of proposing a very hearty vote of thanks to Major Pryer for his most excellent address and his very lucid demonstration of it by X-ray means that afternoon.

Perhaps there was no one amongst them who was more qualified to speak of the abilities of Major Pryer than himself, because Major Pryer was with him for several years as a very valued assistant in his office; he therefore knew of his merits and good qualities, as Major Pryer might know of his (the speaker's) limitations as a commanding officer. (Laughter.) He would like to say that Major Pryer, in regard to all his duties in the Army, liked to do things for the very sake of doing them, and there was no one he (Sir John) knew who could do them better, or even so well. (Hear, hear.) He also knew that Major Pryer did not like eulogy; therefore he felt that he must refrain from saying more other than by expressing, in their name, their very sincere and hearty thanks to Major Pryer for what he had told them and shown to them that evening. (Applause.)

The President (Major Dunkin) now rose to say that that concluded what he thought they would agree had been a very enjoyable afternoon, spent in the company of those whom he might be excused for calling most charming gentlemen. He would say, in conclusion, how greatly the Royal Counties Division appreciated the visit to a meeting of that Division of the Colonel-Commandant of the Royal Army Veterinary Corps, General Sir Layton Blenkinsop, and of the Presidents of the Royal College of Veterinary Surgeons (Mr. G. P. Male) and of the National Veterinary Medical Association (Lieut.-Colonel P. J. Simpson). (Applause.)

Those attending were the President (Major G. W. Dunkin), Mr. J. R. Baxter, Mr. J. Bell, Captain H. B. Collet, Major A. C. Duncan, Captain J. R. Hewer, Major Hamilton Kirk, Mr. G. P. Male (President, R.C.V.S.), Mr. N. P. Male, Major-General Sir John Moore, Captain Brayley Reynolds, Lieut.-Colonel P. J. Simpson (President, N.V.M.A.), Major F. J. Taylor, Major R. C. Tennant, Colonel G. K. Walker, Mr. R. A. Willett and Professor G. H. Wooldridge.

The following participated as hosts or visitors:—Sir Layton J. Blenkinsop, Major H. Allen, Mr. N. S. Barron, Major J. Bell, Major B. R. Body, Mr. G. B. Brook, Mr. C. W. Coulden, Mr. T. M. Doyle, Mr. J. T. Edwards, Mr. H. Greenfield, Major J. Harrison, Mr. C. Holland, Mr. J. M. G. Hughes, Major J. Judge, Major A. J. Kelly, Major G. A. Kelly, Mr. C. J. R. Lawrence, Eric Lilleyfors (Swedish Army), Major C. A. Murray, Mr. W. A. Pool, Major R. H. Stalker, Major G. F. Steevenson, Mr. R. Scott, Captain H. G. Tabuteau-Herrick, Mr. B. I. C. Tennant, Lieut.-Colonel W. H. Walker and Captain G. S. Walker.

J. H. Bell, *Hon. Secretary.*

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

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Correspondence.

The Norwich Congress.

From the President.

To the Editor of The Veterinary Record.

Sir,—As I was unable personally to express my thanks to all those who attended the Congress at Norwich (in many cases at considerable inconvenience to themselves) in order to support the Chair, I ask for a small space in the *Veterinary Record* for that purpose. In the first place, I wish to express my great appreciation of the large number that attended, but more particularly of the warm support and welcome accorded to Mrs. Simpson and myself by the members, their wives and friends. I have been assured that the Congress was voted a success.

This success is attributable, primarily, to the good work put in by the Provisional Committee under the Chairmanship of Professor Buxton, and to them I extend my sincere thanks. To say that the local Hon. Secretary, Mr. H. P. Standley, junr., performed his duties exceptionally well, is to give scant praise. No President could have had a more conscientious and hard-working official. The whole-hearted attention he and his committee gave to every detail made the President's path an easy one. You, Mr. Editor, will doubtless be commenting on the various functions, papers, etc.* so that I will not go into the details of these, but I cannot overlook the splendid hospitality accorded to one and all by the members of the Eastern Counties Division of the N.V.M.A. To the Trade Exhibitors I extend my appreciation of the splendid show of instruments, drugs, books, etc., etc., all of which added to the interest of the meeting.

No congress of a week's duration can take place without some criticisms being passed, and there is no doubt that certain alterations with regard to the time table of the programme can with advantage be considered. More particularly is this so with reference to the day and time of the Annual General Meeting. I shall be happy to receive from any member his suggestions on this or any other matter to which he may wish that attention be drawn. These suggestions should be addressed to the General Secretary, 2 Verulam Buildings, Gray's Inn, W.C.1.

And now for Folkestone, where I shall look forward to meeting all those who so loyally supported me at Norwich, augmented by those who were prevented from attending there.

It is my earnest desire that the Congress of 1932 shall be in every way a " record " one, and I promise I will do all in my power to make it so, but no President can do this without the support of the members, so please from now onwards I ask members to make this their slogan :—

" Folkestone in 1932."

In conclusion, may I express, albeit in very inadequate words, my great appreciation of the honour that has been conferred on me by my re-election as President. I can only hope that I shall, in a small way, prove myself worthy of the great responsibility that has been placed on my shoulders and that, with the help of the Council and permanent officials, the Association during my term of office may progress a step further forward towards the place among the other scientific bodies that we all wish to see it occupy.

Thanking you in anticipation of the insertion of this letter,

I am, Yours sincerely,

P. J. Simpson,

2, Verulam Buildings, President, N.V.M.A
Gray's Inn, W.C.1.

August 31st, 1931.

*** Our issue of September 19th will be the Congress Number.— Ed.**

" Black Gut " in Poultry.

To the Editor of The Veterinary Record.

Sir,—Mr. Blount's letter in your issue of the 15th instant, *re* " Black Gut " in poultry is very interesting, and the matter is at present under investigation. We hope shortly to be able to publish the result.

Yours faithfully,

D. J. Anthony.

Veterinary Department,
Messrs. Marsh and Baxter, Ltd.,
Brierley Hill, Staffs.
August 21st, 1931.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 7th.—Meeting of the Editorial Committee, N.V.M.A., 2 Verulam Buildings, Gray's Inn, at 4.30 p.m.

Sept. 17th.—Meeting of the Midland Counties Division, N.V.M.A., at Birmingham.

Royal Veterinary College.

As a result of the " Eclipse " Ball, organised by Lady Chesham in aid of the Royal Veterinary College Rebuilding Fund, the sum of £2,649 19s. 7d. has been handed over to the Treasurer.

R.C.V.S. Obituary.

Gaunt, John Charles, Rowley Grange, Scarcroft, near Leeds. Graduated London, December 22nd, 1910. Died August 17th, 1931, aged 42 years.

Foot-and-Mouth Disease.

The seventh outbreak of foot-and-mouth disease in the little village of Renhold and the tenth in North Bedfordshire since August Bank Holiday was confirmed last week. It involved a herd of 100 dairy cattle.

The existence of the disease was also confirmed on premises at Penffordd, Clynderwen, in the county of Pembroke, and, later, at Spaldwick, Hunts.

Personal.

Wills.—Devlin, Mr. James, of Coalisland, Co. Tyrone, veterinary surgeon and merchant (personal estate in Great Britain and Northern Ireland), £1,759.

Walker, Mr. Robert John, of Fintona, Co. Tyrone, retired veterinary surgeon (personal estate in Great Britain and Northern Ireland), £1,621.

The Editor acknowledges the receipt of the following :—

Reports of meetings from the Hon. Secretaries of the following Divisions, N.V.M.A. : Eastern Counties, Southern Counties and West of Scotland.

Communications from Messrs. W. G. Beaton (Nigeria) and R. S. Smith (Galston), and Dr. Tom Hare (London).